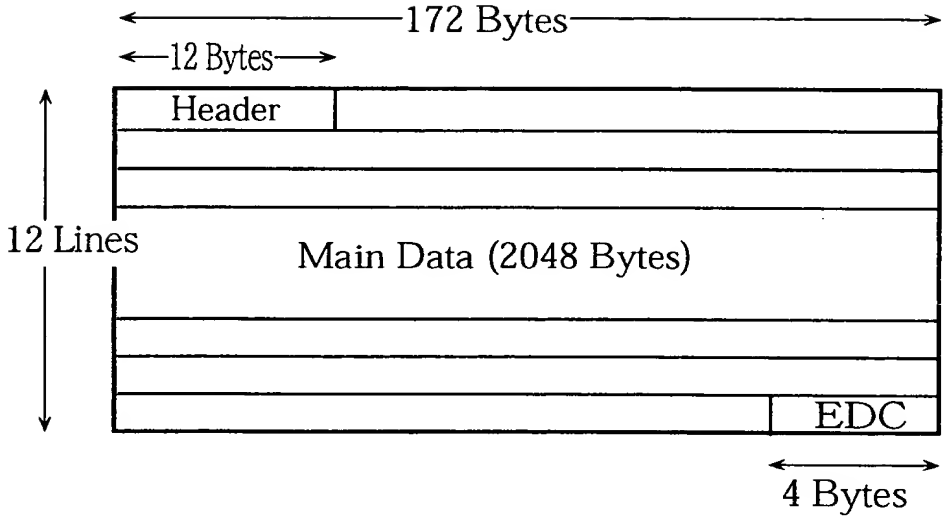
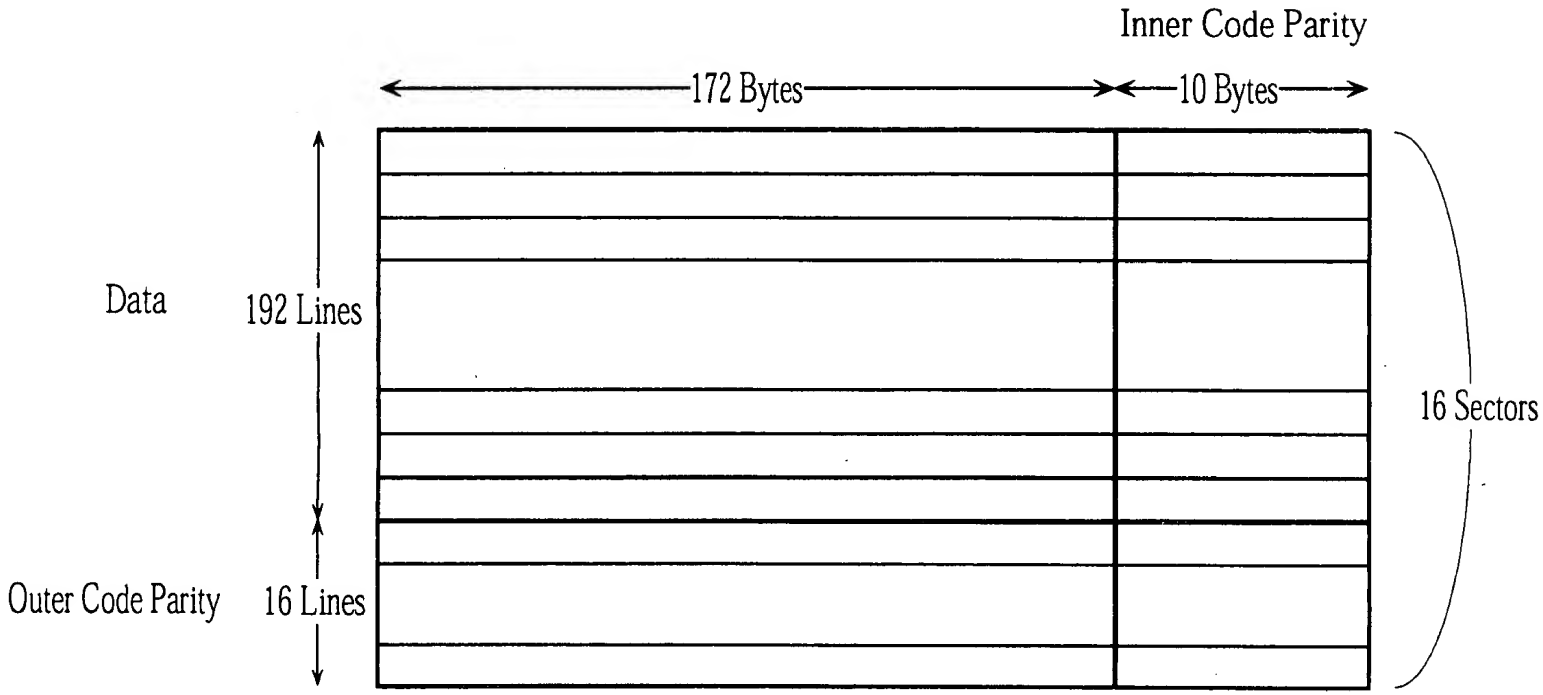
EP 0 802 538 B1

Fig. 1



T08280"8T28h860

Fig. 2



T08280"BT28h860

Fig. 3

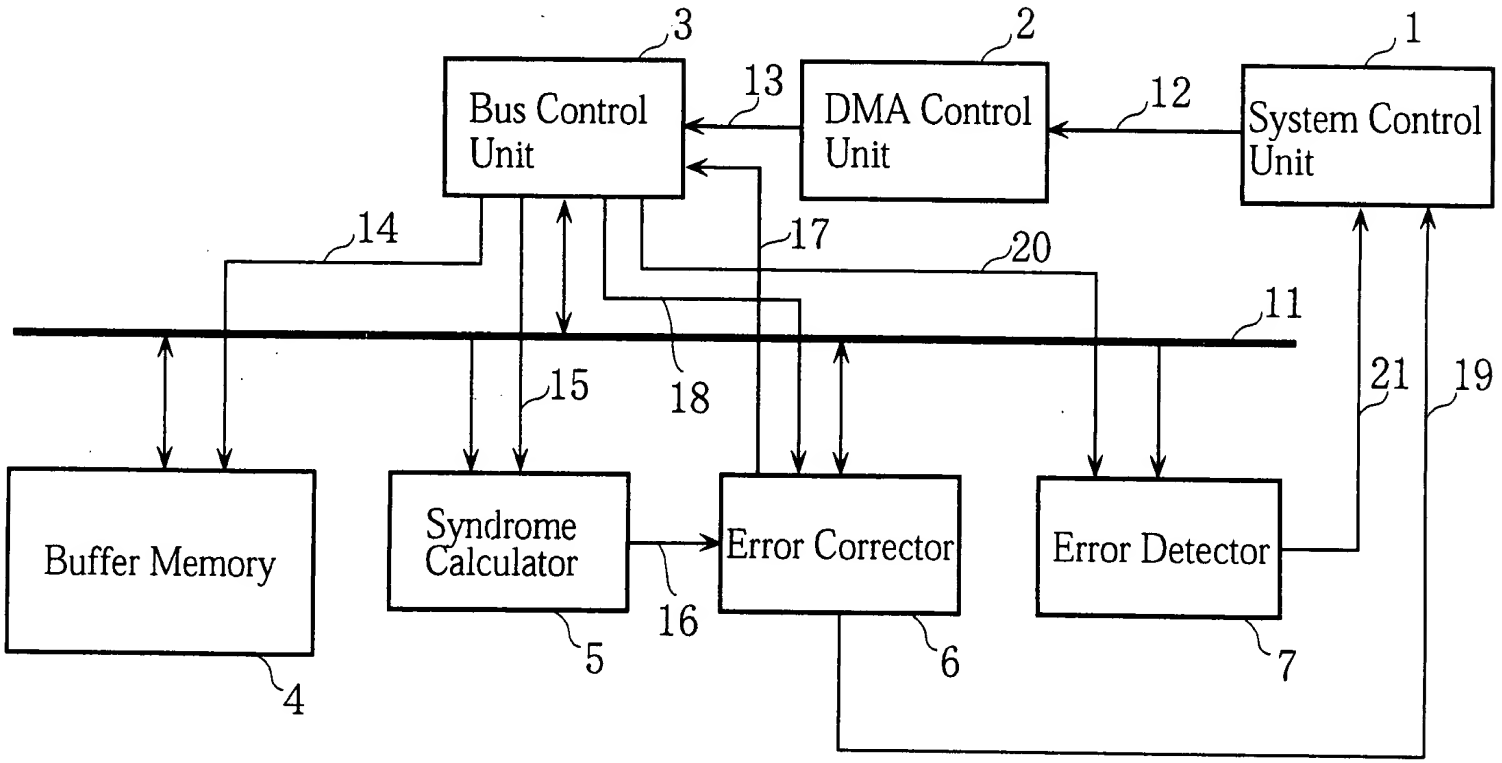
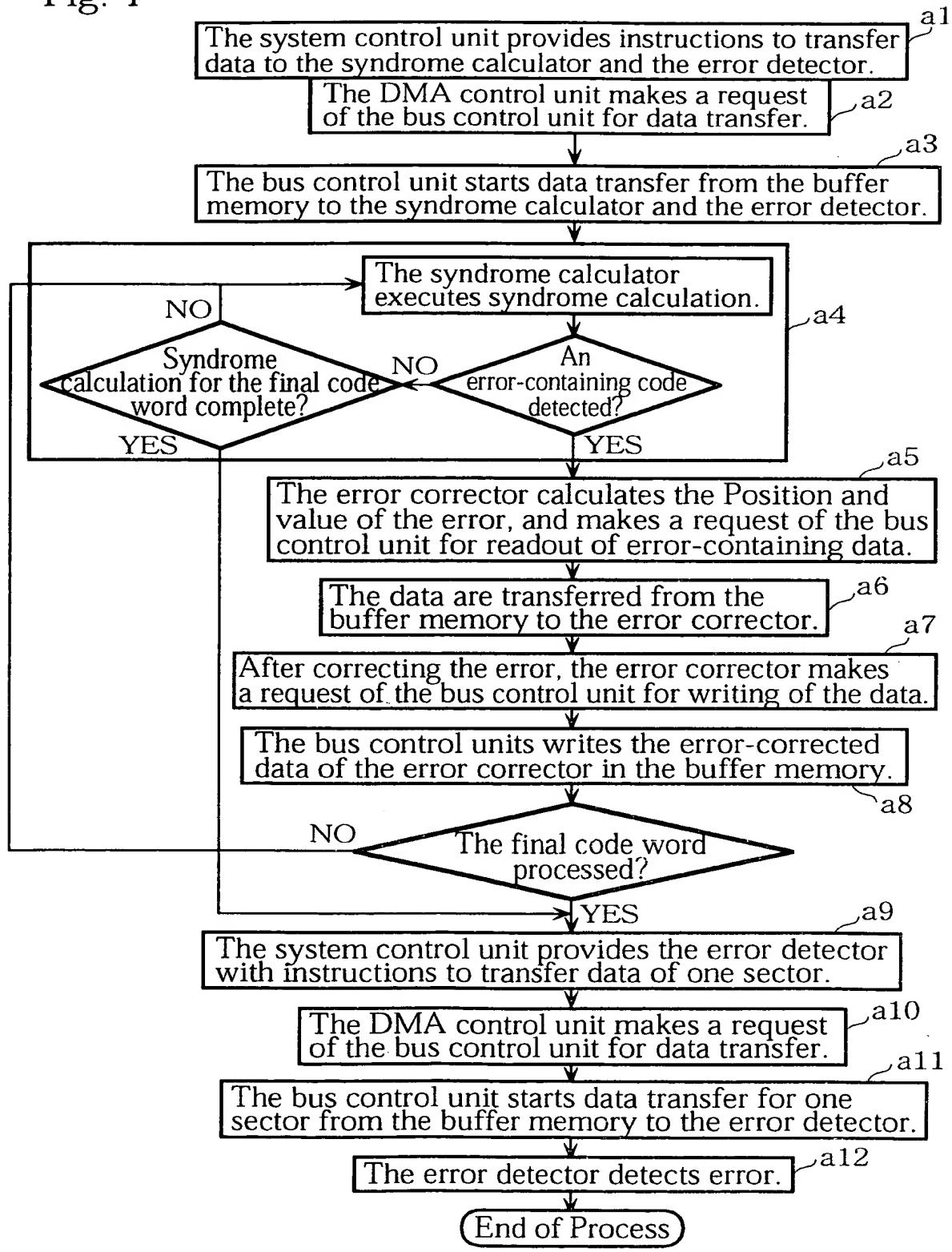


Fig. 4


The system control unit provides instructions to transfer data to the syndrome calculator and the error detector.
a1
The DMA control unit makes a request of the bus control unit for data transfer.
a2
The bus control unit starts data transfer from the buffer memory to the syndrome calculator and the error detector.
a3
The syndrome calculator executes syndrome calculation.
a4
NO
Syndrome calculation for the final code word complete?
NO
An error-containing code detected?
YES
YES
The error corrector calculates the Position and value of the error, and makes a request of the bus control unit for readout of error-containing data.
a5
The data are transferred from the buffer memory to the error corrector.
a6
After correcting the error, the error corrector makes a request of the bus control unit for writing of the data.
a7
The bus control units writes the error-corrected data of the error corrector in the buffer memory.
a8
NO
The final code word processed?
YES
The system control unit provides the error detector with instructions to transfer data of one sector.
a9
The DMA control unit makes a request of the bus control unit for data transfer.
a10
The bus control unit starts data transfer for one sector from the buffer memory to the error detector.
a11
The error detector detects error.
a12
End of Process

T08280"8T28h860

Fig. 5

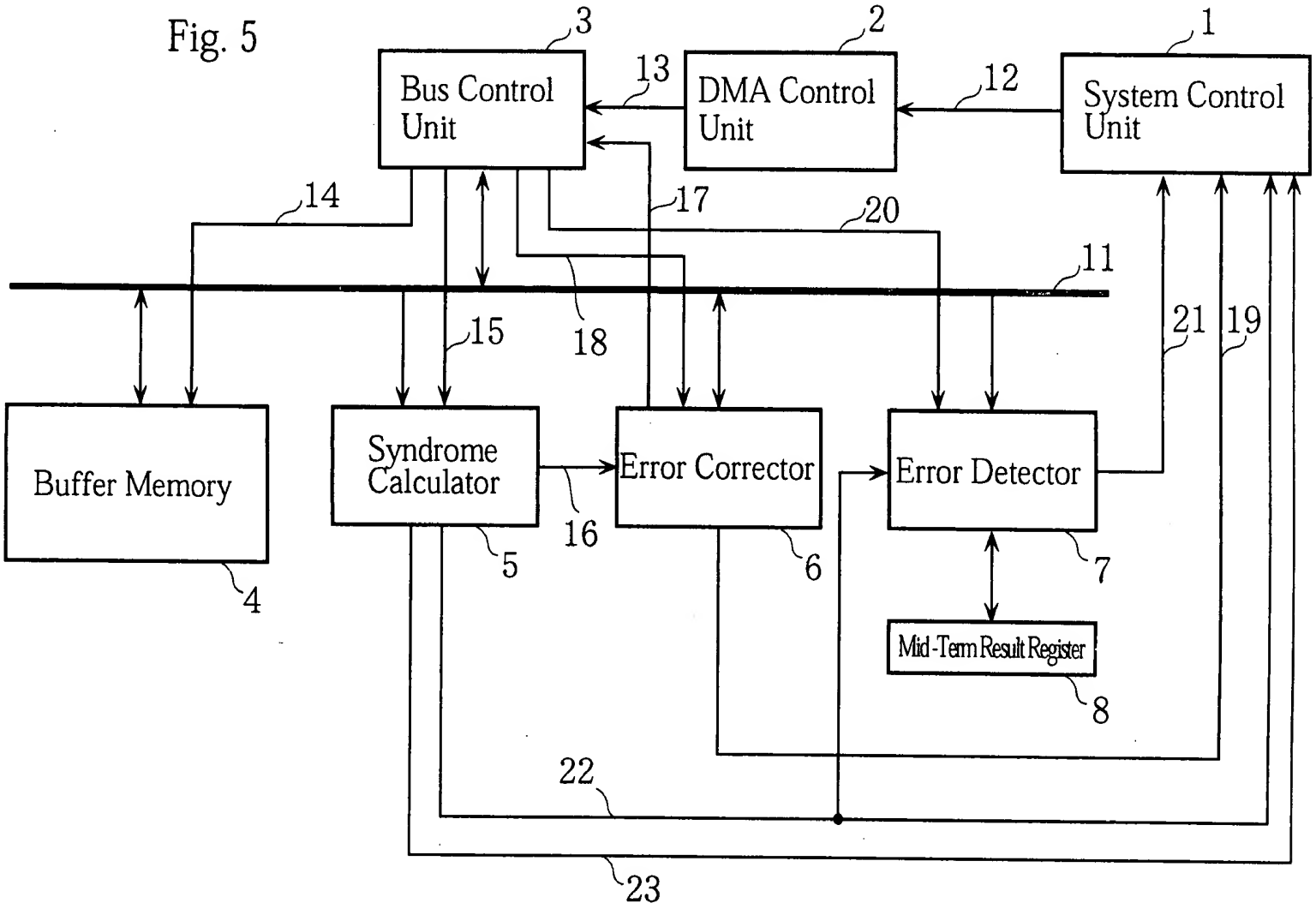
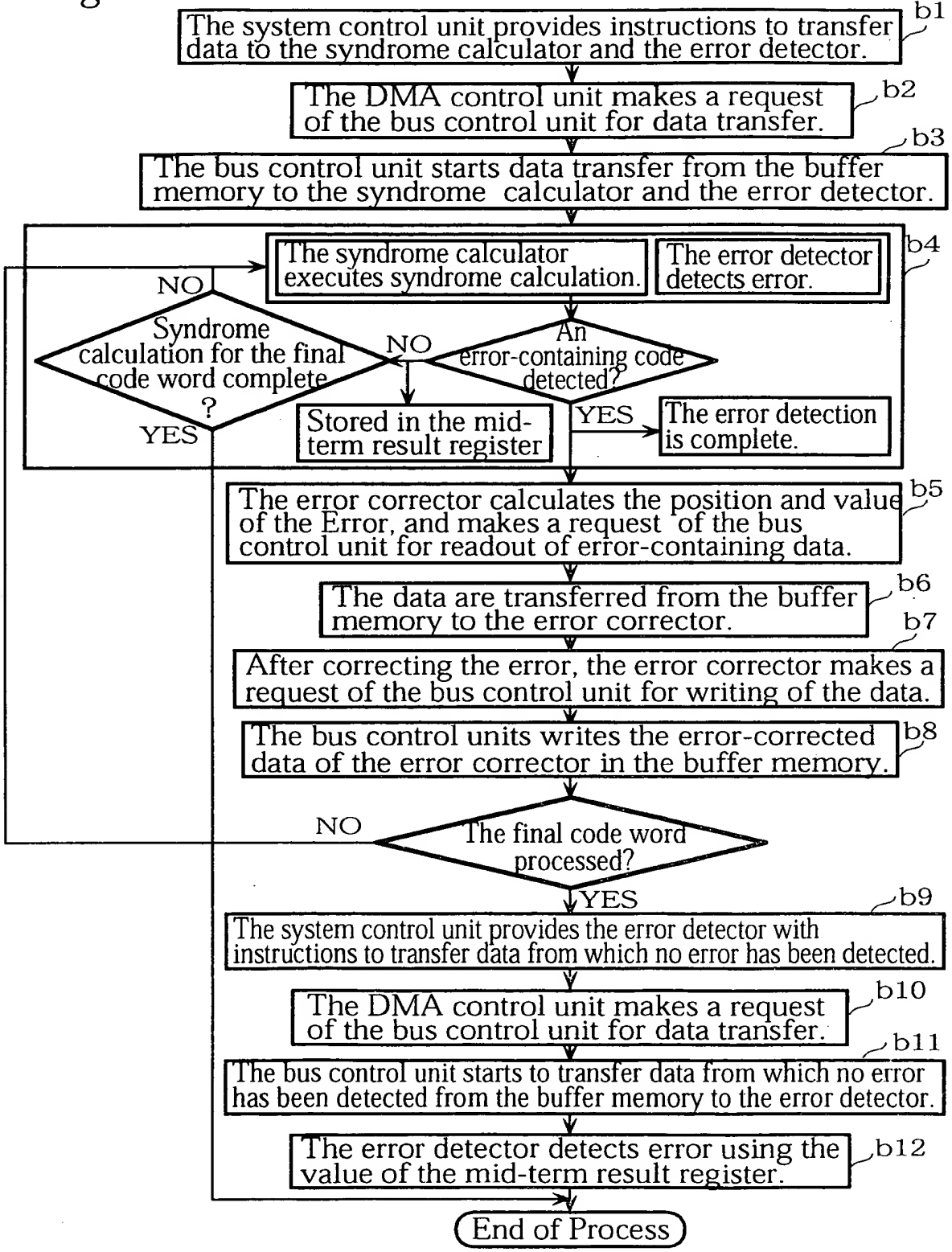


Fig. 6


The system control unit provides instructions to transfer data to the syndrome calculator and the error detector.
b1
The DMA control unit makes a request of the bus control unit for data transfer.
b2
The bus control unit starts data transfer from the buffer memory to the syndrome calculator and the error detector.
b3
The syndrome calculator executes syndrome calculation.
The error detector detects error.
b4
NO
Syndrome calculation for the final code word complete ?
NO
An error-containing code detected?
YES
Stored in the mid-term result register
YES
The error detection is complete.
The error corrector calculates the position and value of the Error, and makes a request of the bus control unit for readout of error-containing data.
b5
The data are transferred from the buffer memory to the error corrector.
b6
After correcting the error, the error corrector makes a request of the bus control unit for writing of the data.
b7
The bus control units writes the error-corrected data of the error corrector in the buffer memory.
b8
NO
The final code word processed?
YES
The system control unit provides the error detector with instructions to transfer data from which no error has been detected.
b9
The DMA control unit makes a request of the bus control unit for data transfer.
b10
The bus control unit starts to transfer data from which no error has been detected from the buffer memory to the error detector.
b11
The error detector detects error using the value of the mid-term result register.
b12
End of Process

T08280 '8T28h860

Fig. 7

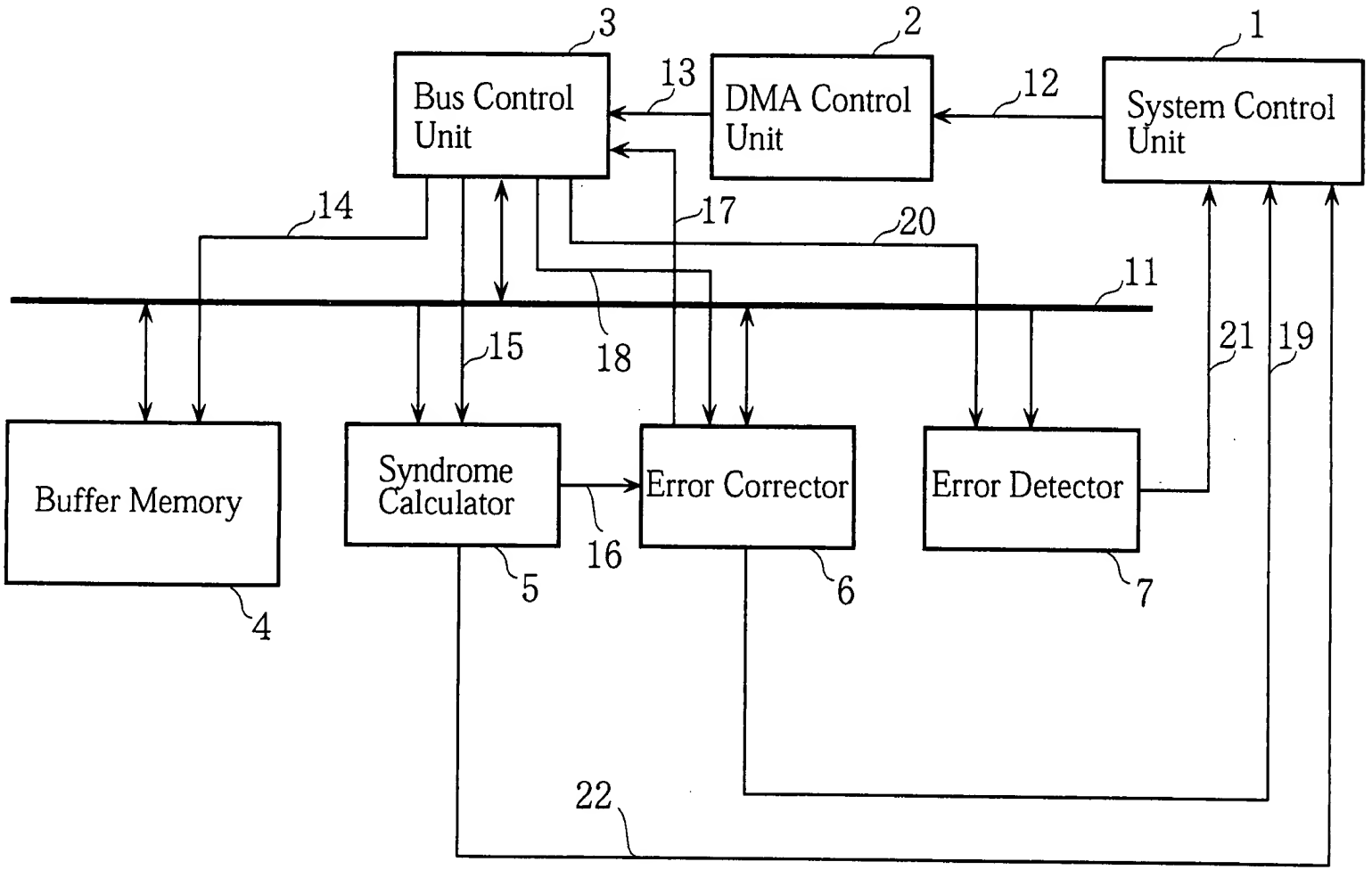
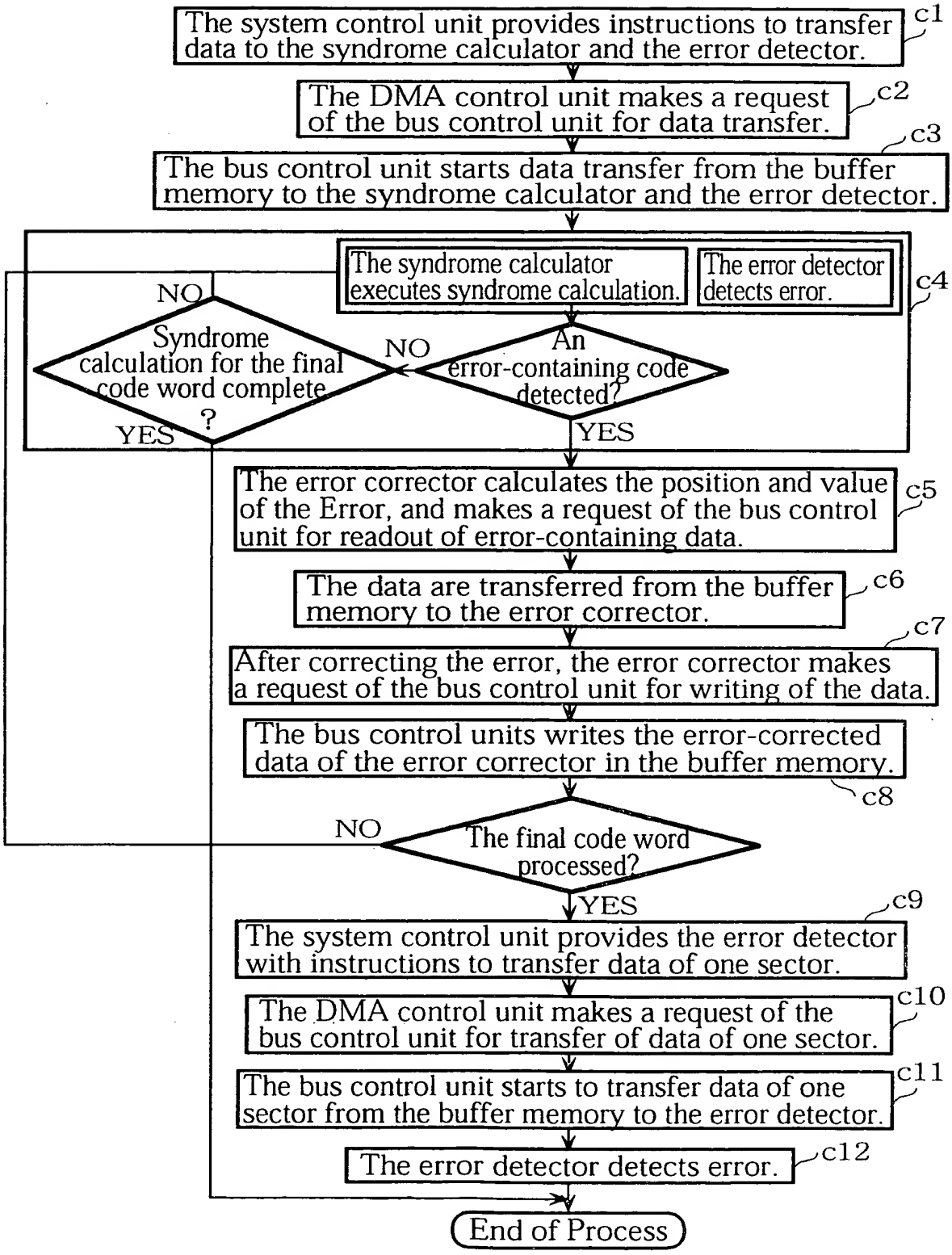


Fig. 8



EP 0 982 734 A2

T08280"8T28h860

Fig. 9

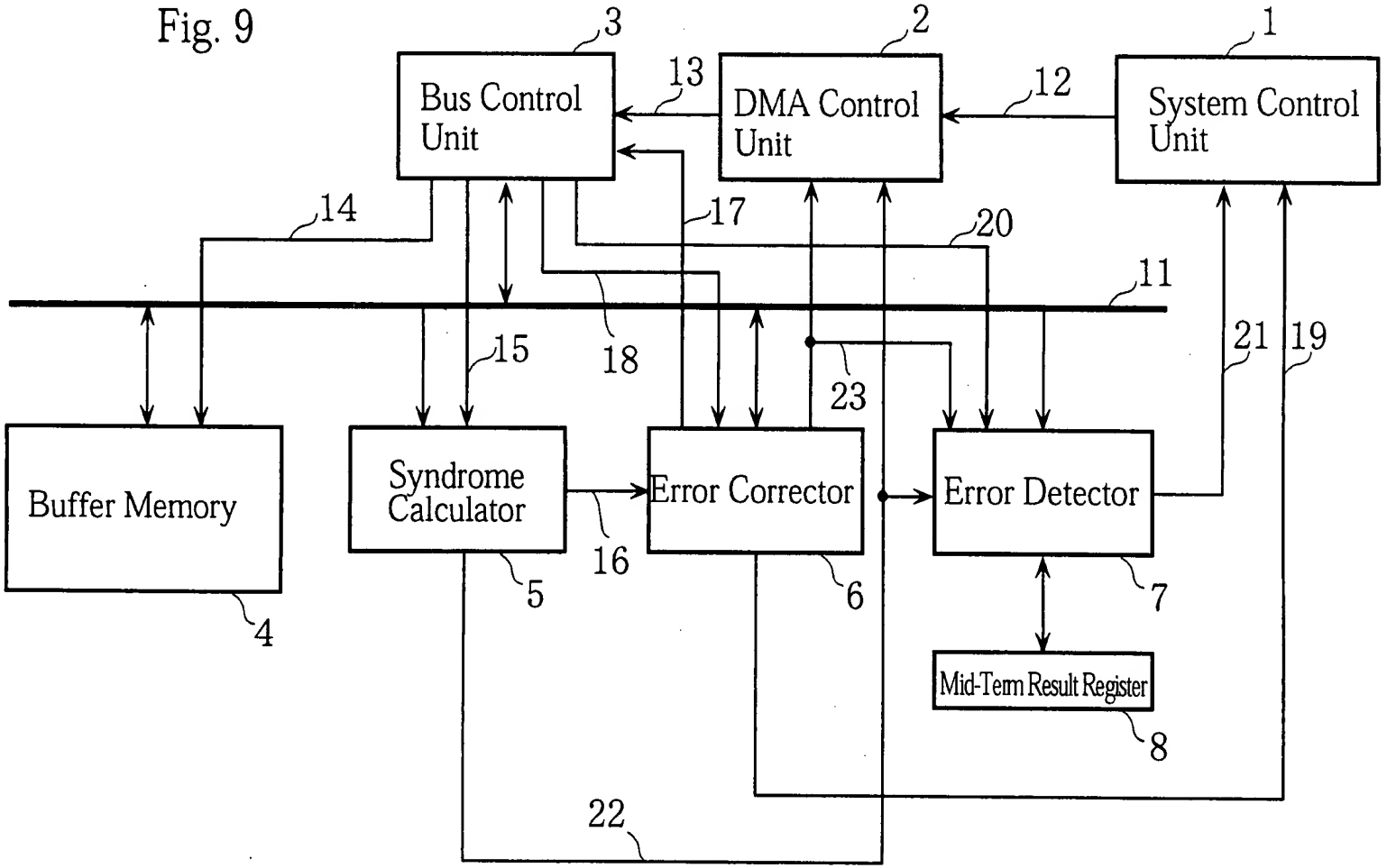


Fig. 10

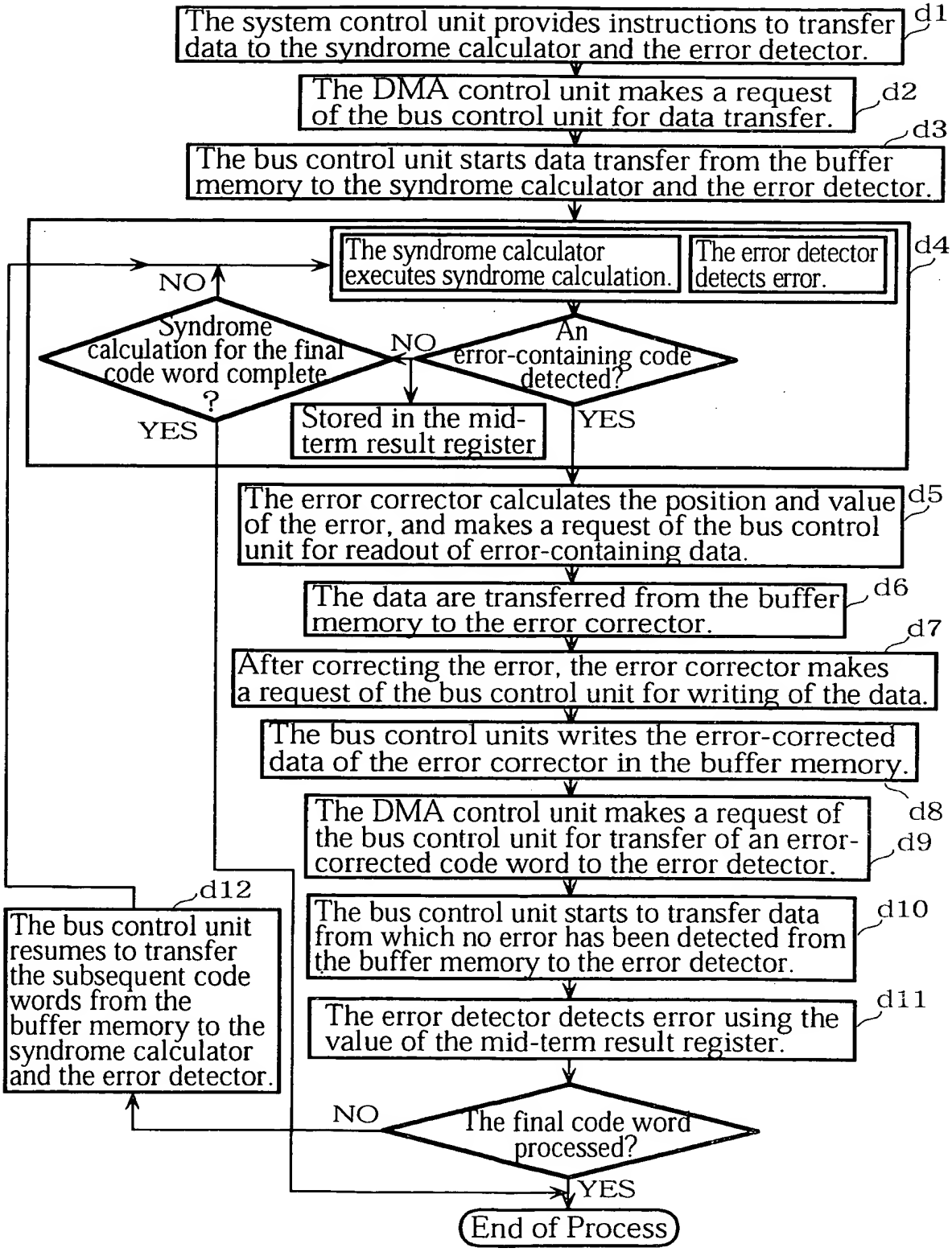
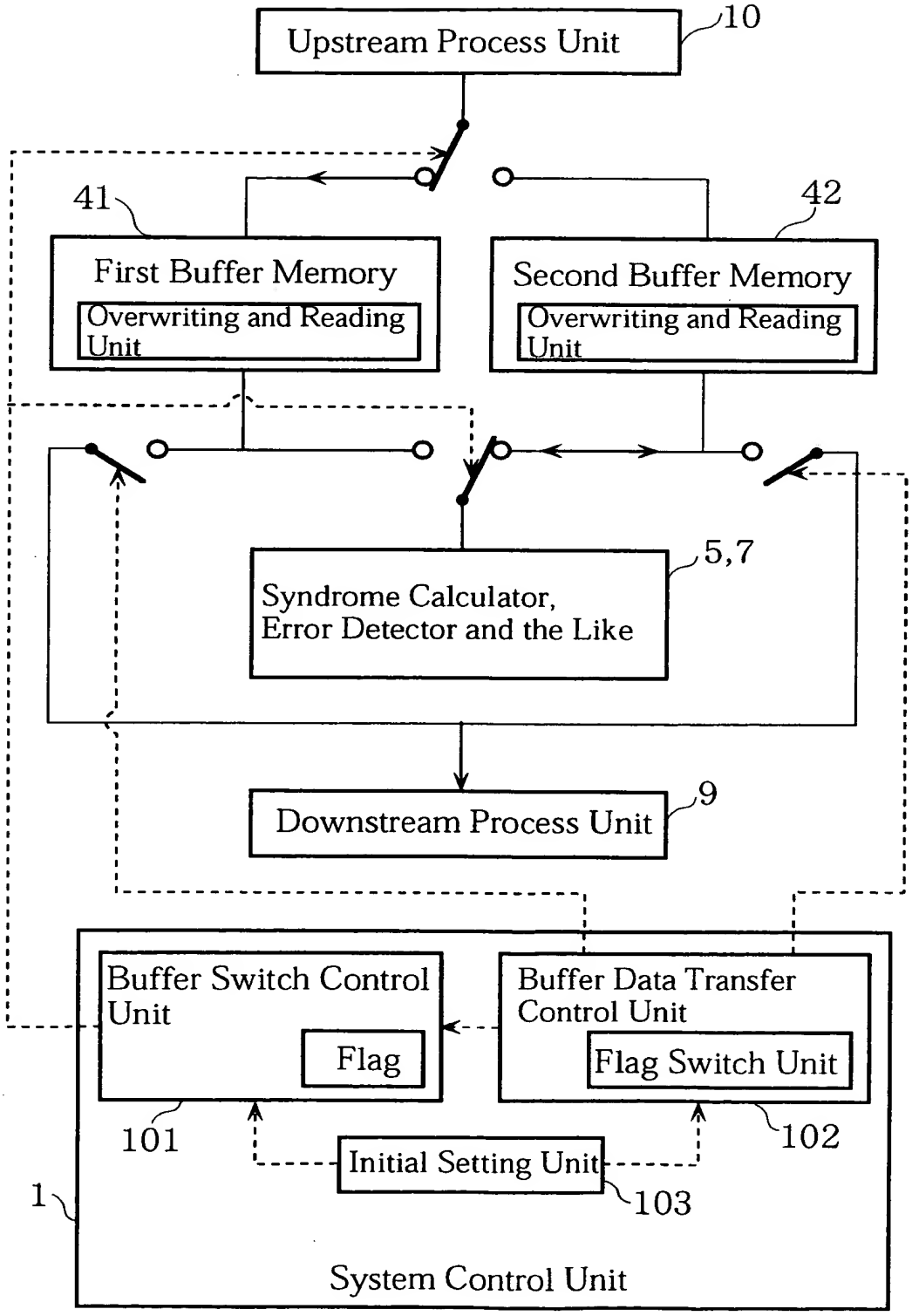
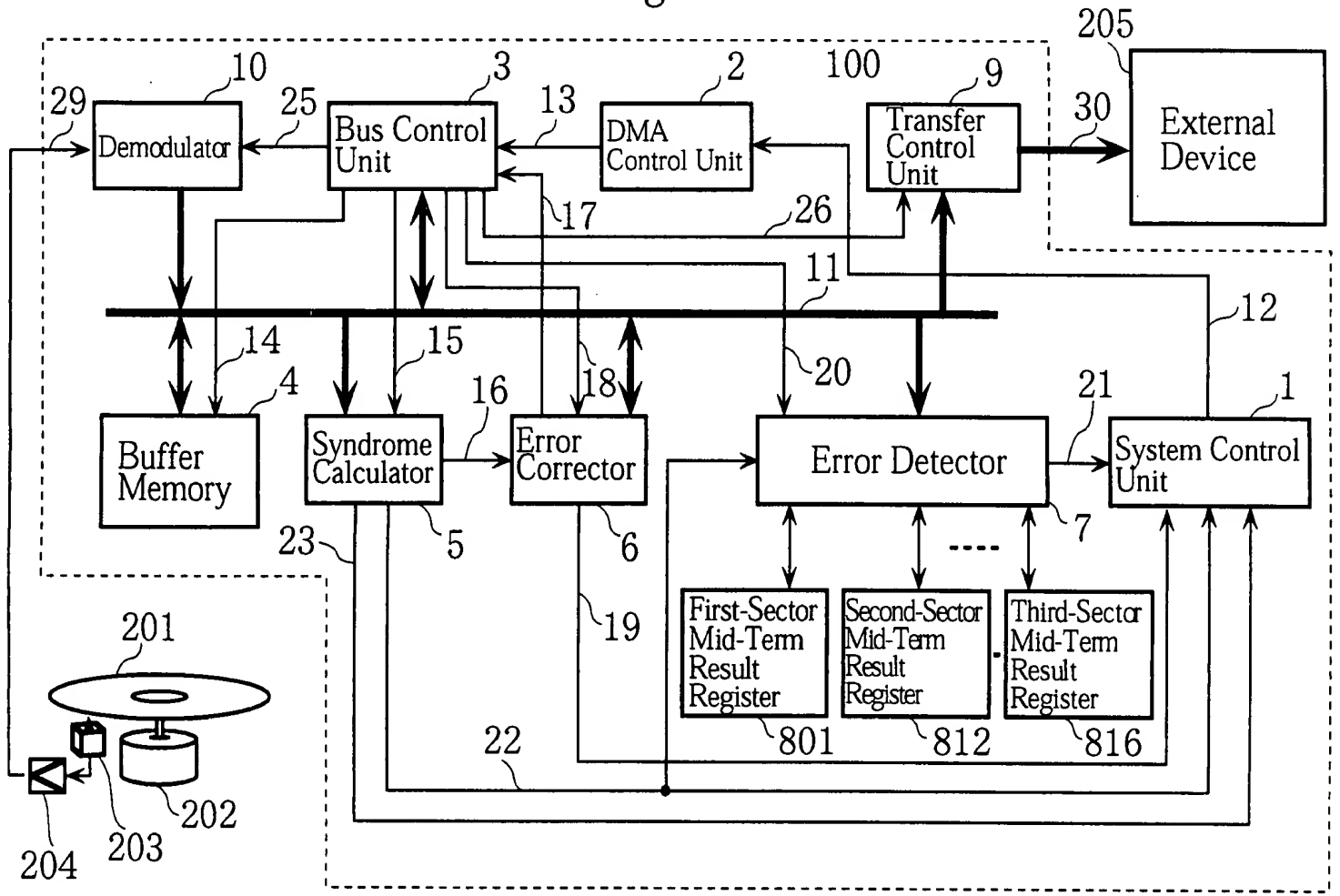

The system control unit provides instructions to transfer data to the syndrome calculator and the error detector.
d1
The DMA control unit makes a request of the bus control unit for data transfer.
d2
The bus control unit starts data transfer from the buffer memory to the syndrome calculator and the error detector.
d3
The syndrome calculator executes syndrome calculation.
The error detector detects error.
d4
NO
Syndrome calculation for the final code word complete ?
NO
An error-containing code detected?
YES
Stored in the mid-term result register
YES
The error corrector calculates the position and value of the error, and makes a request of the bus control unit for readout of error-containing data.
d5
The data are transferred from the buffer memory to the error corrector.
d6
After correcting the error, the error corrector makes a request of the bus control unit for writing of the data.
d7
The bus control units writes the error-corrected data of the error corrector in the buffer memory.
d8
The DMA control unit makes a request of the bus control unit for transfer of an error-corrected code word to the error detector.
d9
The bus control unit starts to transfer data from which no error has been detected from the buffer memory to the error detector.
d10
The error detector detects error using the value of the mid-term result register.
d11
The bus control unit resumes to transfer the subsequent code words from the buffer memory to the syndrome calculator and the error detector.
d12
NO
The final code word processed?
YES
End of Process

Fig. 11


Upstream Process Unit
10
41
42
First Buffer Memory
Overwriting and Reading Unit
Second Buffer Memory
Overwriting and Reading Unit
Syndrome Calculator, Error Detector and the Like
5,7
Downstream Process Unit
9
Buffer Switch Control Unit
Flag
Buffer Data Transfer Control Unit
Flag Switch Unit
101
102
Initial Setting Unit
103
1
System Control Unit

TO8280 "8T28h860

Fig. 12



T08280 "BT28h860

Fig. 13

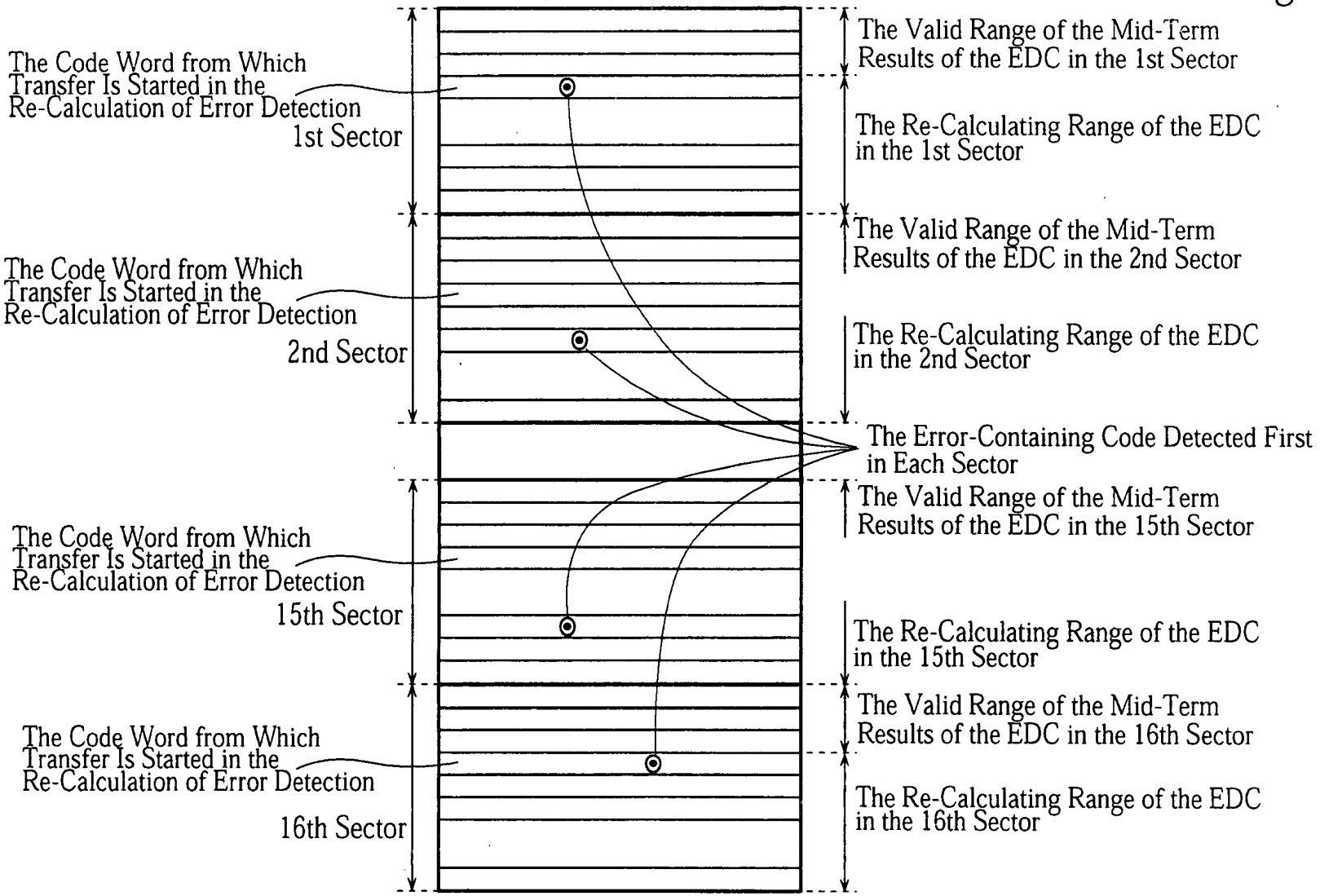
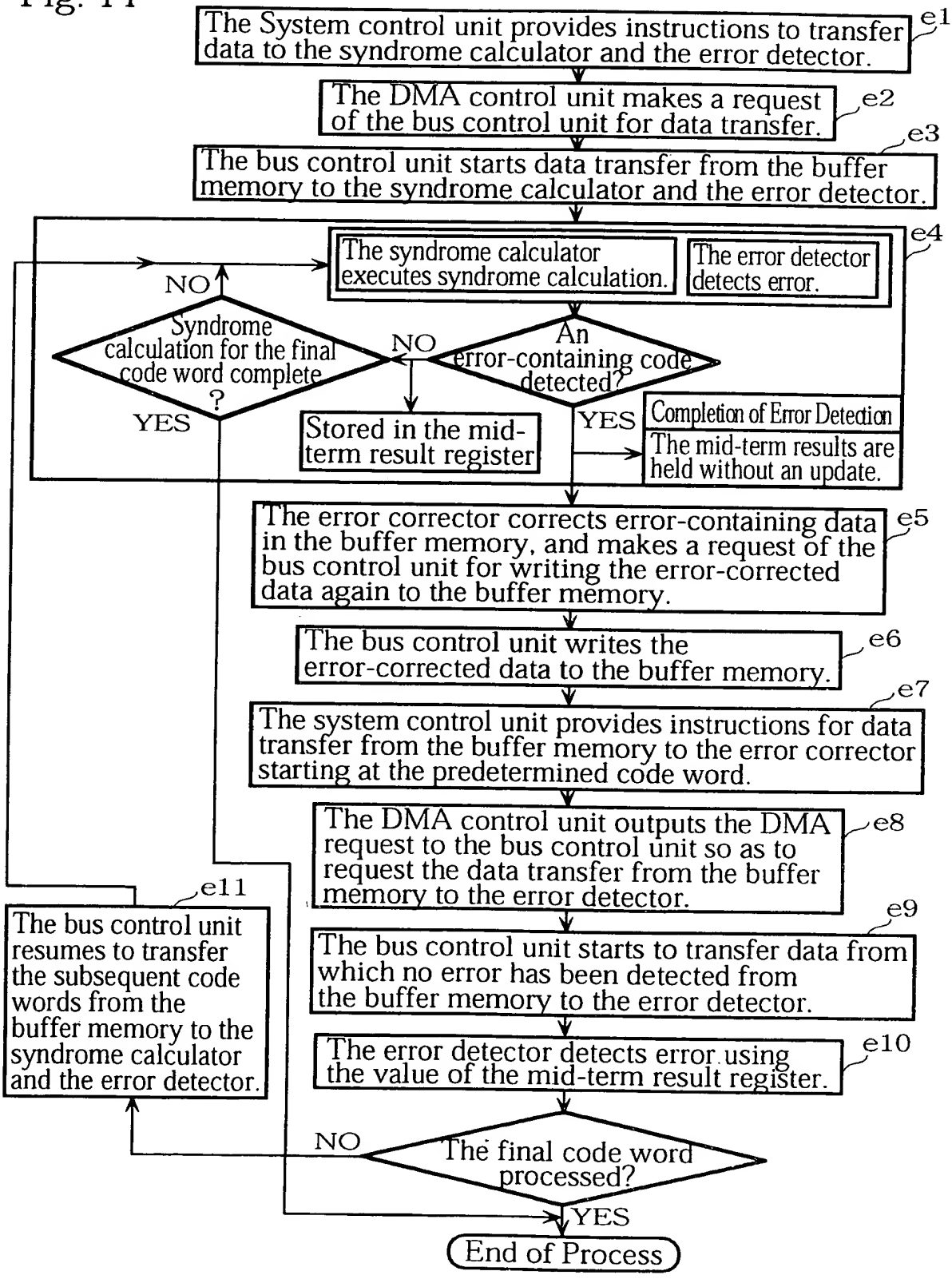
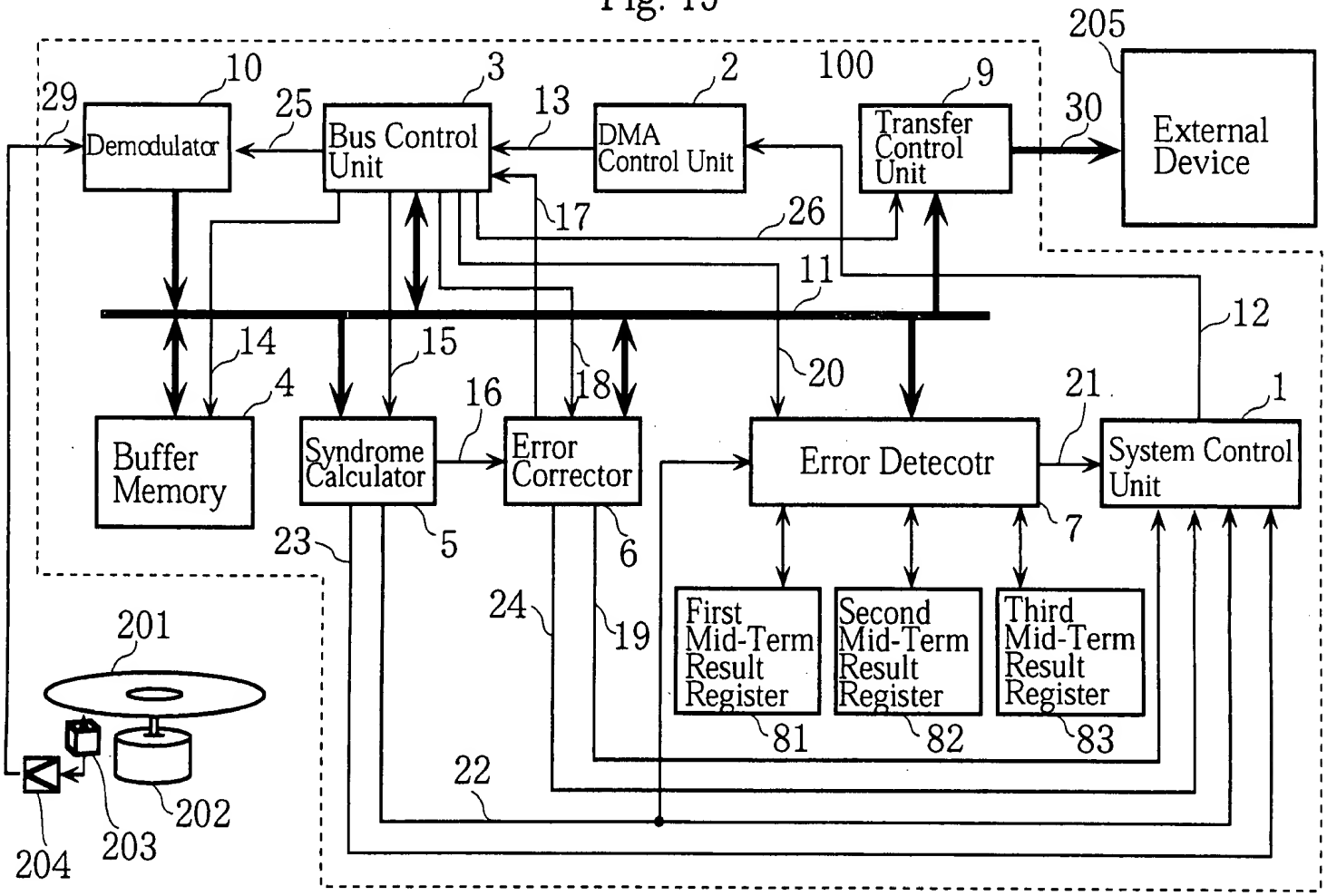


Fig. 14


The System control unit provides instructions to transfer data to the syndrome calculator and the error detector.
e1
The DMA control unit makes a request of the bus control unit for data transfer.
e2
The bus control unit starts data transfer from the buffer memory to the syndrome calculator and the error detector.
e3
e4
The syndrome calculator executes syndrome calculation.
The error detector detects error.
NO
Syndrome calculation for the final code word complete ?
NO
An error-containing code detected?
YES
Stored in the mid-term result register
YES
Completion of Error Detection
The mid-term results are held without an update.
The error corrector corrects error-containing data in the buffer memory, and makes a request of the bus control unit for writing the error-corrected data again to the buffer memory.
e5
The bus control unit writes the error-corrected data to the buffer memory.
e6
The system control unit provides instructions for data transfer from the buffer memory to the error corrector starting at the predetermined code word.
e7
The DMA control unit outputs the DMA request to the bus control unit so as to request the data transfer from the buffer memory to the error detector.
e8
e11
The bus control unit resumes to transfer the subsequent code words from the buffer memory to the syndrome calculator and the error detector.
e9
The bus control unit starts to transfer data from which no error has been detected from the buffer memory to the error detector.
The error detector detects error using the value of the mid-term result register.
e10
NO
The final code word processed?
YES
End of Process

T08280 '8128h860

Fig. 15



T08280" 8T28h860

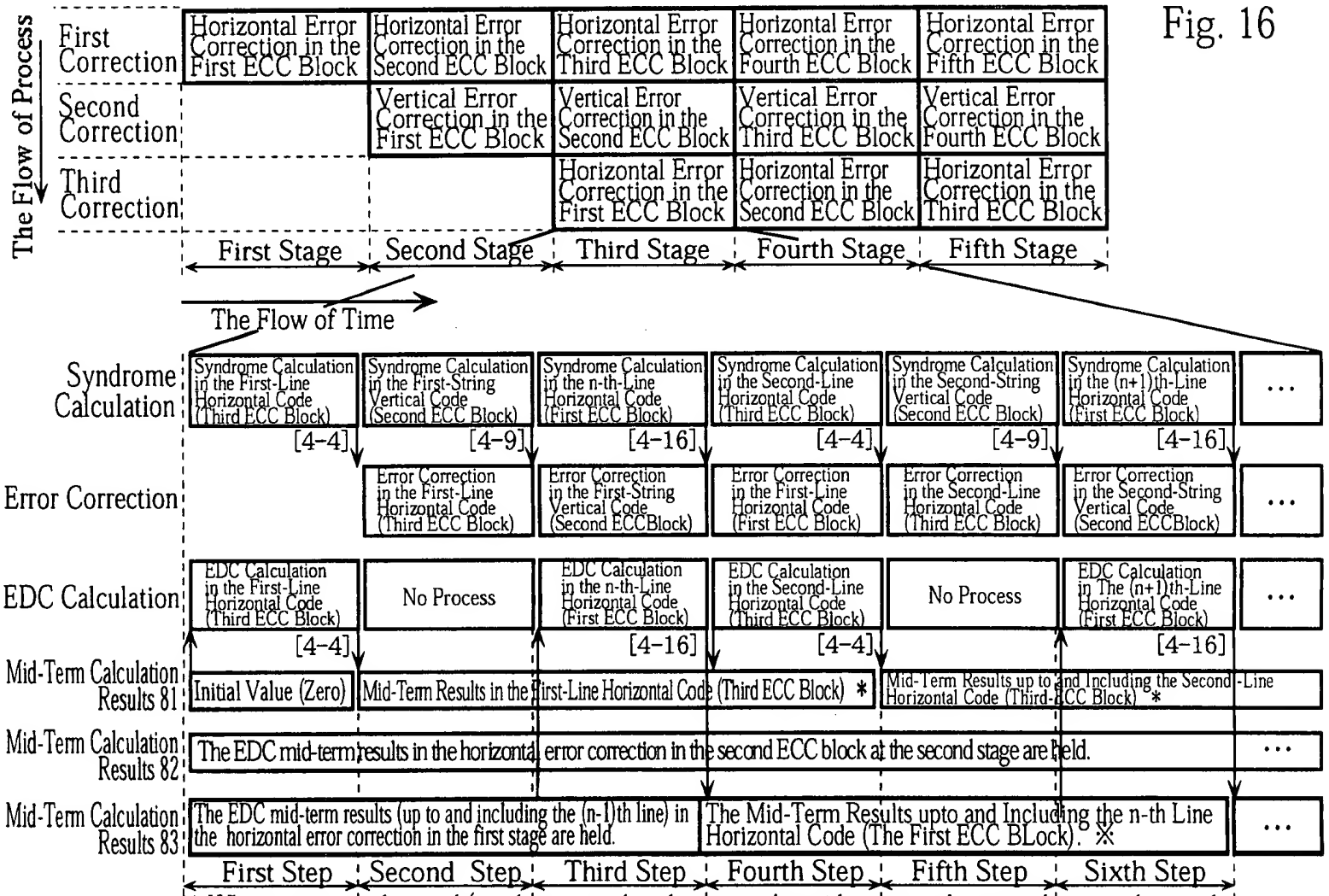
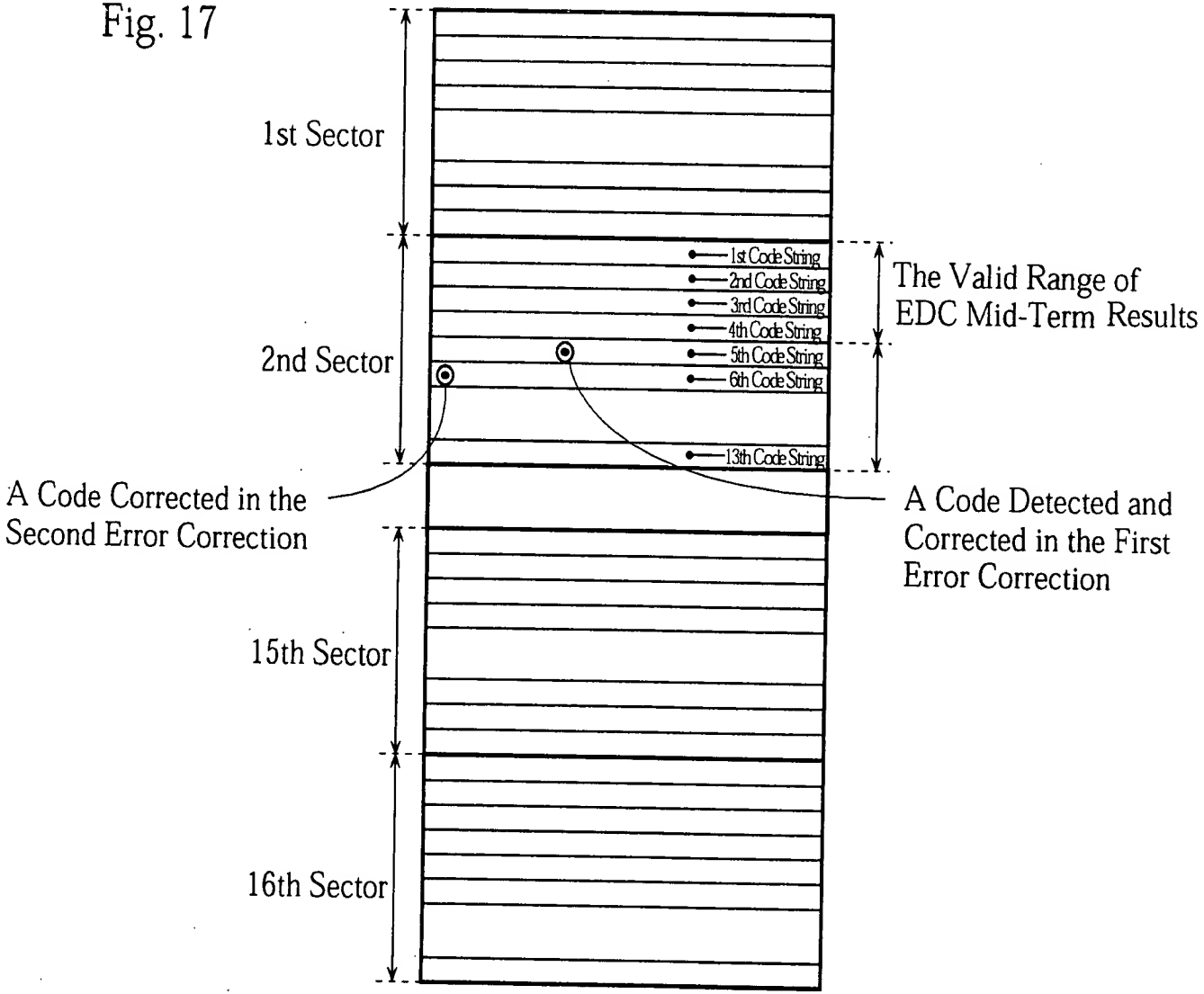


Fig. 16

* When a error is detected (syndrome is other than zero, the mid-term results up to the preceding code string are held without an update.

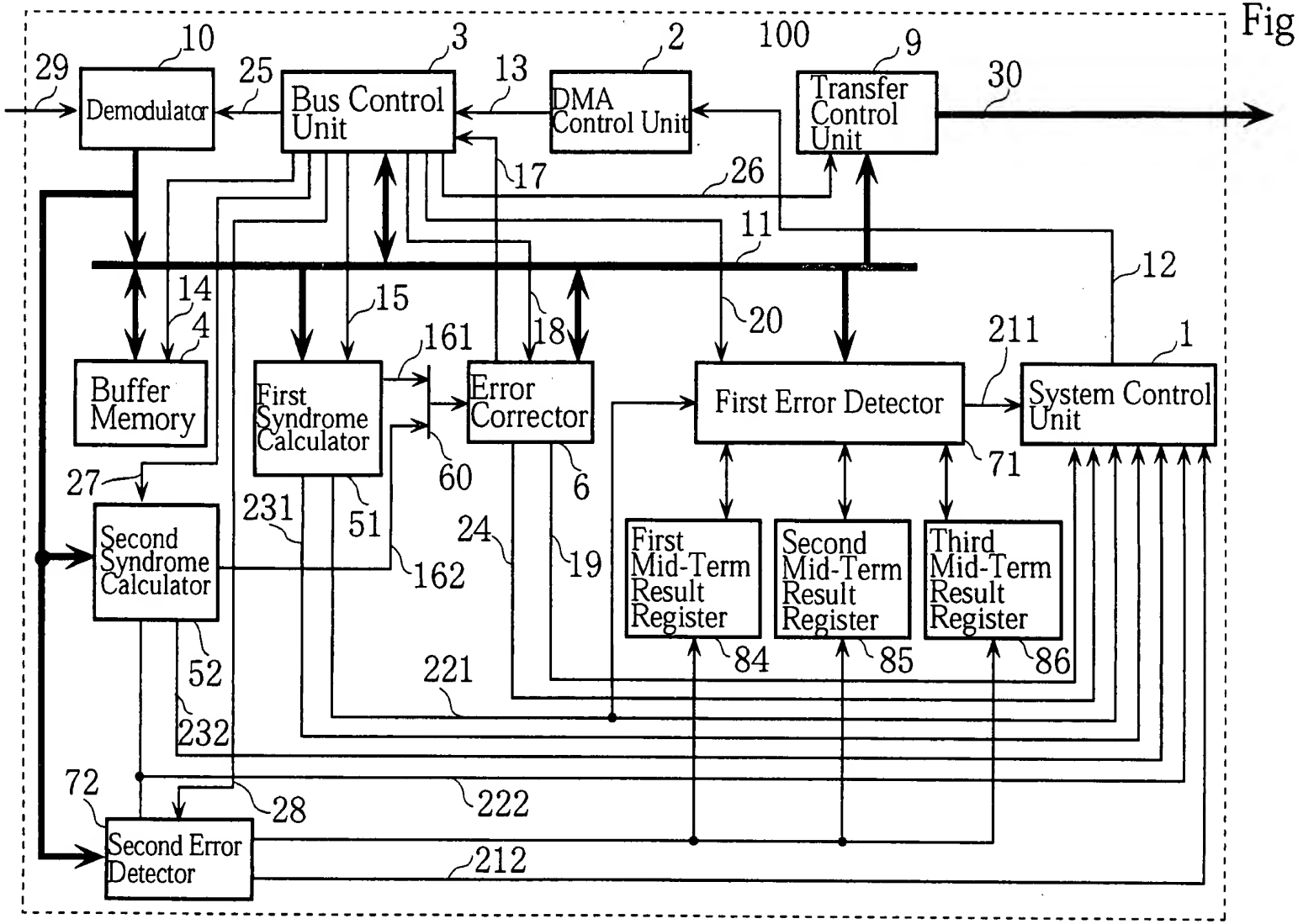
T08280"8T28h860

Fig. 17



T08280"8T28h860

Fig. 18



T08280"8T28h860

Fig. 19

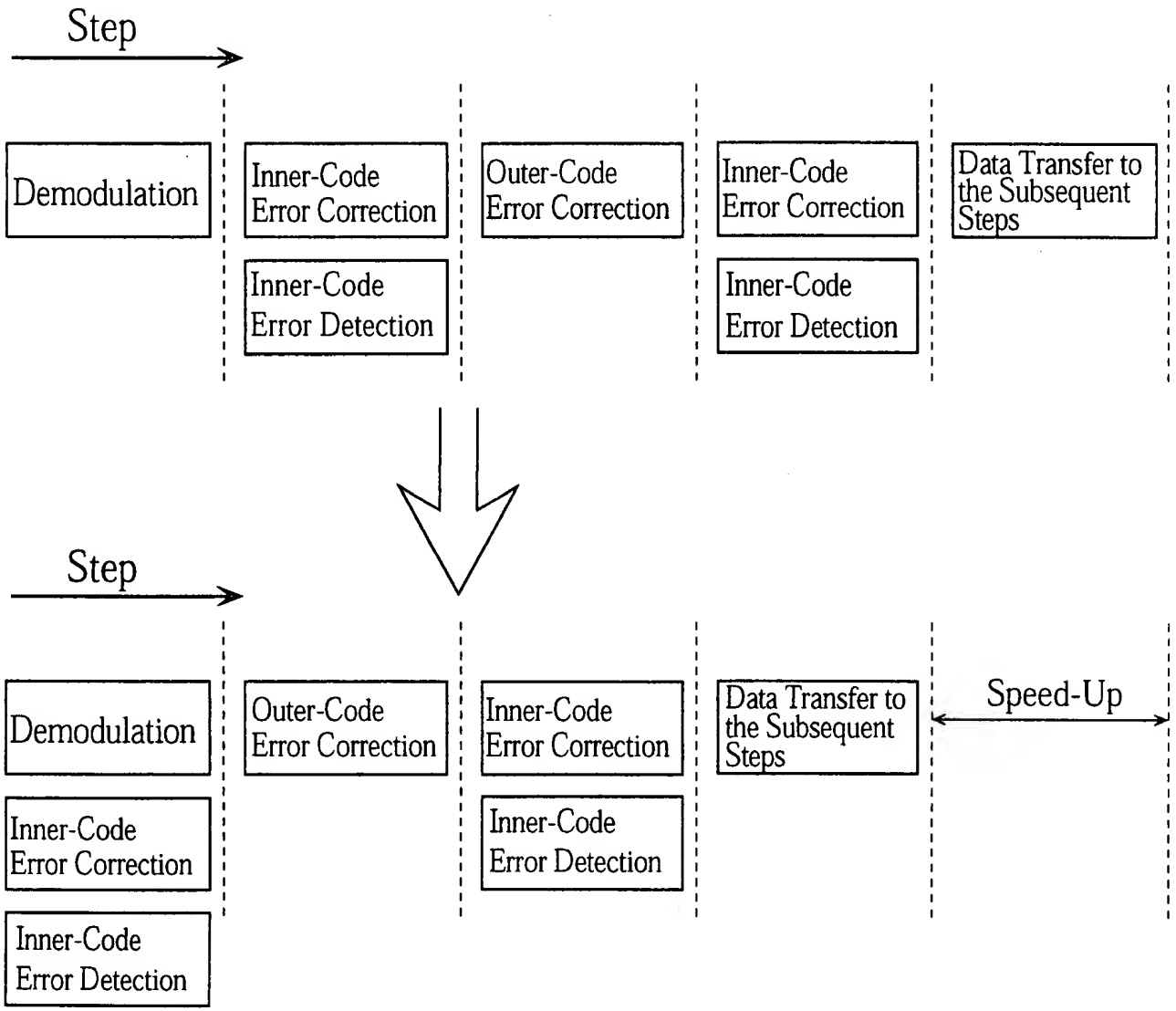


Fig. 20

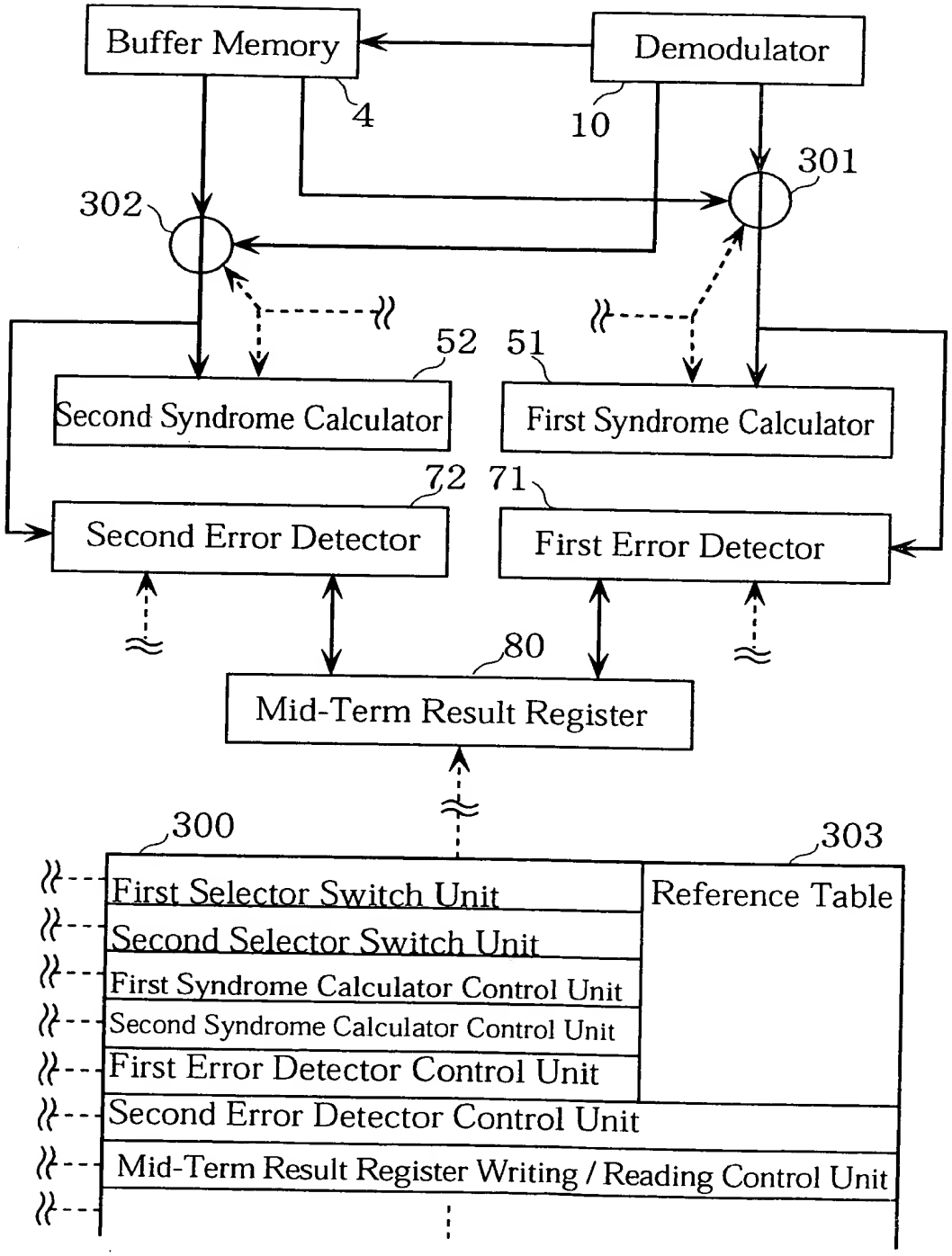

Buffer Memory
Demodulator
4
10
301
302
52
51
Second Syndrome Calculator
First Syndrome Calculator
72
71
Second Error Detector
First Error Detector
80
Mid-Term Result Register
300
303
First Selector Switch Unit
Second Selector Switch Unit
First Syndrome Calculator Control Unit
Second Syndrome Calculator Control Unit
First Error Detector Control Unit
Second Error Detector Control Unit
Mid-Term Result Register Writing / Reading Control Unit
Reference Table

Fig. 21A

Process Unit	Processing Targets			
	ECC	Selector	Word	Vertical
First Syndrome Calculator	1	2	3	—
〃		〃	〃	〃
First Error Detector	—	—		13
〃	〃	〃	〃	
〃	〃	〃	〃	〃

Fig. 21B

ECC	Site	Selector	Word	Vertical	Number of Times
First ECC	In Process of Demodulation	6	2	3	1
Second ECC	Buffer Memory	9	2	3	2
〃	Buffer Memory	〃	〃	〃	〃